

Pharmacodynamics

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Adverse drug reactions

- Harm associated with the use of a drug

Classification of ADR

- Rawlin & Thompson classification
ABCDE
- 80% of ADR---Type A reactions

Type **A** reaction

- Extensions of the principal pharmacological action of the drug (**A**ugmented)
- Predictable
- Common
- Dose dependent

- Overdose and toxicity (hepatotoxicity with acetaminophen)
- Side effects at therapeutic dose (dry mouth with antihistaminic)
- Drug interactions

Type **B** reaction (**B**izarre)

- Unrelated to known pharmacological actions of drug
- Unpredictable
- Often caused by immunological & pharmacogenetic mechanisms
- Unrelated to dosage
- rare & cause serious illness or death

Type **B** reaction (**B**izarre)

- **Hypersensitivity** (immunological reaction)
e.g., anaphylaxis with penicillin, Direct mast cell activation & degranulation by vancomycin
- **Idiosyncratic Reactions:**
 - An uncommon
 - abnormal response to drug
 - Usually due to genetic abnormality
e.g., hemolysis by antioxidant drugs
(G6PD deficiency)=====favism

Type **C** (**C**hronic) Reactions

- Associated with long-term drug therapy
- Well known and can be anticipated

- E.g., Corticosteroids induced diabetes

Type **D** (**D**elayed) Reactions

- Carcinogenic Effect

Medication lead to cancer; take >20 y to develop

- Teratogenic Effect

Drug- induced birth defects

Tetracycline.....dental hypoplasia



Type **E** (following withdrawal of some drugs)

- **Abstinence**: discontinuation of **addicting** drugs
- **Corticosteroid** sudden stop.....**Addisonian** crisis
- **Beta blockers** sudden stop.....**Angina or infarction**

Drug interaction

- Clinically important drug interaction occurs with:
 - Low TI
 - Drugs with enzyme inducing or inhibiting properties
 - Patients receive multiple drugs
 - Elderly
 - Impaired liver and kidney

Drug interaction

- Pharmaceutical?????/?
- Pharmacokinetic
- Pharmacodynamic

Pharmacokinetic interaction

- Tetracycline ↓ absorption of Ca, Mg, AL



- Aspirin displace warfarin from PPB....
bleeding

Pharmacokinetic interaction

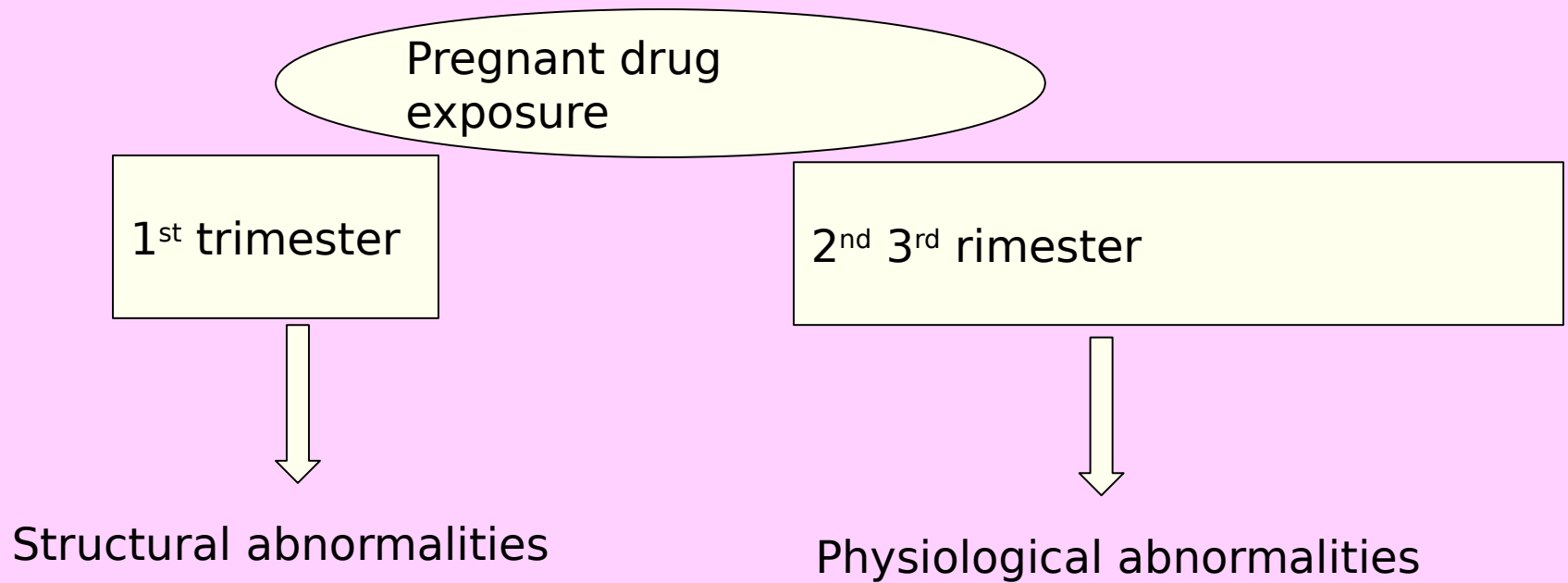
- Rifampicin enzyme inducer.....
↑ metabolism of OCPs.....pregnancy
- Erythromycin is enzyme inhibitors.....
↓ metabolism of warfarin.....potentiation

Pharmacodynamics interaction

- Summation ($1+1=2$)
- Synergism ($1+1=5$)
- Potentiation: ($a+b=B$) one intensify the action of the other

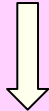
Drugs and pregnancy

- All drugs nearly cross placenta except heparin and insulin (large molecules)



Drugs and pregnancy

1st
trimester



Structural abnormalities

Tetracycline: tooth discoloration
and hypoplasia

Phenytoin: cleft palate

2nd 3rd trimester



Physiological
abnormalities

morphine: respiratory depression

aminoglycoside: 8th cranial nerve
damage

FDA categorization of teratogenic drugs

Category from

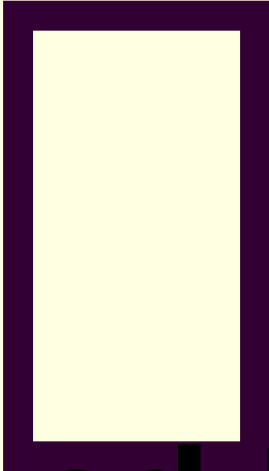

A (no risk)

B

C

D

X (contraindicated)



Good Luck